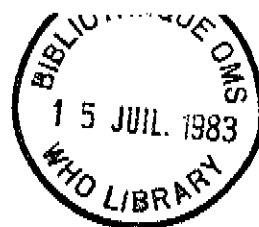


TDR/PB/84-85

Sixth Programme Report  
PROPOSED PROGRAMME BUDGET  
FOR THE 1984-1985 BIENNIUM AND  
ESTIMATES FOR 1986-1987



10 May 1983

UNDP/WORLD BANK/WHO

Special Programme for  
Research and Training in Tropical Diseases

PROPOSED PROGRAMME BUDGET FOR THE 1984-1985 BIENNIUM AND ESTIMATES FOR 1986-1987

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LIST OF ABBREVIATIONS AND SYMBOLS

AFI	Administration and Finance Information System	SMG	Scientific Working Group
BCV	Biological Control of Vectors	TDR	Special Programme for Research and Training in Tropical Diseases (Tropical Diseases Research)
BIOS	Biomedical Sciences		
CHEMAL	Chemotherapy of Malaria		
DIF	Director's Initiative Fund	THELEP	Chemotherapy of Leprosy
ESC	Executive Sub-Group (of the RSG)	TSA	Technical Services Agreement
FIELDMAL	Applied Field Research in Malaria	WHO	World Health Organization
IMMAL	Immunology of Malaria	P	Professional Staff
IMMLEP	Immunology of Leprosy	GS	General Services Staff
JCB	Joint Coordinating Board	n.a.	A calculation cannot be made or the results of a calculation are meaningless
MISTR	Management Information System (TDR)	( )	Numbers in parentheses are <u>negative</u>
RSG	Research Strengthening Group	-	Indicates that the activity or item does or did not exist as a budget item. No attempts at calculations involving such activities or items have been made.
STAC	Scientific and Technical Advisory Committee		
STRC	Scientific and Technical Review Committee (of STAC)		

1. PROGRAMME SUMMARY

1.1 Objectives

The Special Programme for Research and Training in Tropical Diseases (TDR) is an international response to major health problems of developed countries in the tropics. The Programme was planned and initiated by the World Health Organization (WHO), with the assistance and co-sponsorship of the United Nations Development Programme (UNDP) and the World Bank (the Bank). TDR operates under the guidance of and with the resources provided by its Cooperating Parties, whose representatives meet as the Joint Coordinating Board (JCB).

The Programme promotes and coordinates the participation of the world's scientific community, who plan and manage goal-oriented research, training and institution strengthening activities directed towards the Programme's two interdependent objectives:

- to develop new and improved tools to control six tropical diseases: malaria, schistosomiasis, filariasis (including river blindness or onchocerciasis), trypanosomiasis (both African sleeping sickness and the American form, Chagas' disease), leishmaniasis and leprosy; and
- to strengthen the research capabilities, including training, in the tropical countries.

1.2 Organization and Operation

Governments and national research institutions participate with the Programme's co-sponsors at all levels

Understanding (TDR/CP/78.5) which describes their functions, composition and operation.

The JCB and the STAC meet at least annually with the meeting of the STAC preceding that of the JCB by about three months. The Standing Committee, composed of representatives of the three co-sponsoring agencies, meets at least twice each year.

JOINT COORDINATING BOARD: Membership on 1 January 1983:

Argentina	Nigeria
Australia	Norway
Belgium	Republic of Korea
Brazil	Sweden
Canada	Switzerland
China	Thailand
Denmark	Turkey
France	USSR
Germany, Federal	United Kingdom
Republic of	United Republic of Cameroon
India	USA
Malawi	The United Nations Development Programme
Mali	
Mexico	The World Bank
Netherlands	The World Health Organization

The Programme's Research and Development activities fall within six disease and four trans-disease components. National scientists, working together as Scientific Working

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of management, operations and evaluation - from policy-setting by the Joint Coordinating Board (JCB) to the execution of individual projects. A multidisciplinary group of scientists serves in their personal capacities as members of the Scientific and Technical Advisory Committee (STAC) to advise the JCB on the Scientific and Technical development of TDR and evaluate its progress.

The Programme's Administrative and Technical Bodies include:

- the Joint Coordinating Board (JCB),
- the Standing Committee (the three co-sponsors),
- the Scientific and Technical Advisory Committee (STAC).

These three bodies and the other management mechanisms of the Programme were developed by the three co-sponsors and by governments and other organizations cooperating in the Programme. The co-sponsors and 35 governments and other organizations endorsed these management structures on 2 February 1978 in a Memorandum of

Groups, establish goal-oriented research plans for each component. The research projects which bring these plans into operation are carried out by scientists at national institutions. Steering Committees composed of 6-8 scientists and members of the secretariat manage the operations of each SWG.

The Research Capability Strengthening activities are guided by the Research Strengthening Group, which reviews and makes recommendations on institution strengthening and training activities. The RSG also monitors and evaluates implementation, operation and progress of these activities. The Executive Sub-Group of the RSG supports the RSG in its work.

Co-sponsorship, a unique feature of the Special Programme, enables TDR to draw upon the experience and expertise of three agencies: the UNDP, the World Bank, and WHO. UNDP and the Bank became co-sponsors of the Special Programme in 1976 and 1977, respectively, and the Tropical Diseases Research Fund began to operate at the Bank in April 1978, following the signature of the "Tropical Diseases Research Fund Arrangements" between the Bank and WHO.

### 1.3 Policy Framework

The Special Programme operates within the policy and programme framework of the World Health Organization and is regularly reviewed by the World Health Assembly, the Executive Board, and the Regional and Global Advisory Committees on Medical Research. The Programme's strategies and priorities are developed and coordinated within this framework, and TDR is executed, reviewed and evaluated through the management mechanisms established by the JCB, the Standing Committee and STAC.

TDR was established in 1975 in response to Health Assembly resolution WHA27.52, and initial plans were endorsed in resolution WHA29.71. In 1977, in response to the first progress report (document A30/11), the Thirtieth World Health Assembly (resolution WHA30.42) invited the Director-General to use budgetary provisions according to priorities approved within the Programme. The Director-General reported on further progress to the Thirty-third World Health Assembly (1980) which requested him to continue the development and operation of TDR according to the plans in his report, and to continue to make budgetary provisions for it (A33/VR/17). Following an evaluation by its Programme Committee, the WHO Executive Board, at its 71st session in January 1983, endorsed the Programme, its structure, and the evaluation mechanisms built into it and requested the Director-General to study, with the executive heads of the two co-sponsoring Agencies, means of increasing the level of financial contributions (EB71.R10).

### 1.4 Scientific and Technical Status (31 December 1982)

From its inception in 1975 until 31 December 1982,

vectors of filariasis and malaria has started and several additional promising candidates are under development. At the same time, the Research Capability Strengthening support, awarded exclusively to institutions and scientists in developing endemic countries, continues to expand and the early effects of training and institution strengthening are becoming apparent.

Details of the scientific progress and plans of each Programme Component can be found in the Sixth Programme Report of TDR and are summarized with the individual component budget proposals in sections 5 and 6 of this document.

#### 1.5 Financial Status (31 December 1982)

By the end of 1982, 27 governments (including those of 11 developing countries) and eight other organizations, together with UNDP, the World Bank and WHO, had contributed over US\$ 117 million to the Programme.

At its Fourth Session in December 1981, the Joint Coordinating Board approved a maximum budget of US\$ 61.6 million for 1982-83, to permit the Programme to maintain its momentum. However, since it appeared unlikely that funds available would reach that sum, the JCB approved continuation of the contingency plan for financial management which was first approved by JCB(3).

The estimates as of 31 December 1982 were that the funds available during the year plus those expected during 1983 would not reach the approved budget figure of US\$ 61.6 million.

To the maximum extent possible, the estimated short-

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TDR had supported 1 655 projects, and over 2 850 scientists from 126 WHO Member States had participated in the planning, implementation, operation and evaluation of the Programme. More than US\$ 88 million had been obligated for direct support to national scientists and institutions. In 1982 fifty-four percent of project funds went to developing countries affected by the tropical diseases.

The scientific progress of the Programme continues to be encouraging and gain momentum. For example, initial testing in humans of a possible vaccine against leprosy will begin in 1983 and progress towards a vaccine against malaria continues with cautious optimism. Several potential new drugs against malaria are being developed and one of these should be ready for national registration in 1983. The field application of one biological agent against the

fall has been managed by scaling down management costs, the use of consultants, the amount of duty travel and the number and size of meetings. However, the limit to which this can be done has been reached and a serious impact in Operations will occur unless the resource picture improves. Section 3 of this document contains analyses of the impact of a shortfall in available funds.

#### 1.6 Plans for the 1984-1985 Biennium

The plans for the 1984-1985 biennium include the continuation of promising work already underway, especially in the areas mentioned in paragraph 1.4, and the start of a limited number of new activities, including the broadening of field trials of the candidate leprosy vaccine. These plans are described in sections 5 and 6.

2. DEVELOPMENT AND PRESENTATION OF THE PROPOSED PROGRAMME BUDGET

2.1 Development

The sequence for the development of the TDR Programme Budget is as follows.

(1) The SWG Steering Committees (for Research and Development) and the Research Strengthening Group and its Executive Sub-Group (for Research Capability Strengthening) modify or develop scientific and technical plans for the upcoming financial period.

(2) Draft budgets for Programme Areas.

(a) The Steering Committees and the Secretariat translate the scientific and technical plans into a draft Programme Budget for each SWG and associated Programme Component.

(b) The RSG, its Executive Sub-Group and the Secretariat develop a draft programme budget for the Research Capability Strengthening Programme Area.

(c) The Secretariat prepares a draft Budget for the Technical and Administrative Bodies and for Programme Management.

(3) The Programme Director prepares a consolidated draft programme budget according to budget guidelines provided by the Standing Committee and JCB.

experience. Details of these factors and their calculation can be found in Annex V, WHO Proposed Programme Budget for the Financial Period 1984-85 (WHO Document PB/84-85).

Cost factors have not been applied to other parts of the Budget (e.g. operations), since standard costs cannot reflect adequately the wide variability in costs inherent in the Programme's world-wide range of operations. For the nonstandard-cost activities a ten per cent inflation rate was assumed for 1984-85 over the 1982-83 biennium.

2.2.2 Purchasing Power

Currency fluctuations and inflation rates in the countries where TDR activities occur continue to erode the purchasing power of the funds made available to both TDR and to the institutions receiving TDR support. The decrease in unit purchasing power of the Programme's Technical Services Agreements has continued during the past 12 months and the trend seems likely to continue.

2.2.3 Budget Increases (Decreases)

In many of the 1984-1985 budget tables, there are two columns for per cent increase; the first is entitled "% Increase" and the second "% Real Increase".

% Increase - This is a gross comparison of the projected cost of each activity or item in the two biennia 1982-83 and 1984-1985. The calculation deals only with increases or decreases in the budget levels. It is calculated by dividing the proposed amount for the 1984-85 bien-

(4) STAC reviews and revises the draft programme budgets for Research and Development and Research Capability Strengthening.

(5) The Programme Director prepares the final proposed Programme Budget and presents it to the Standing Committee for review and comments and to the JCB for approval or revision.

## 2.2 Comments

### 2.2.1 Cost Factors

For certain TDR activities, standard costs or "cost factors" are applied. These factors are calculated by WHO and are based on analysis of costs over previous years. Such cost factors have been applied for personnel, consultants and meetings (both at WHO/HQ and elsewhere). The factors used to calculate consultant costs are modified WHO-supplied figures based on analysis of Special Programme

niun by that in 1982-83, multiplying by 100 and subtracting 100 from the result.

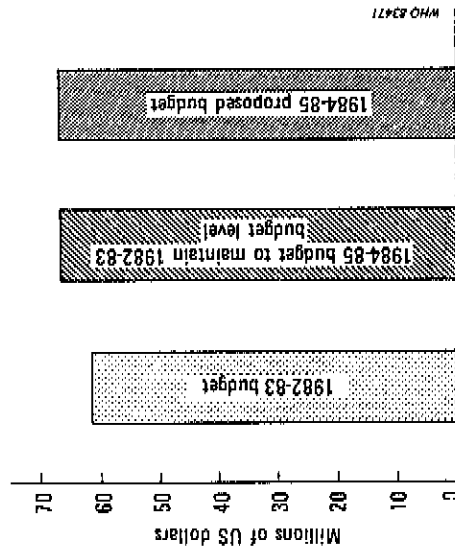
% Real Increase - This is a comparison of the relative size or scale of an activity or item in the two biennia. It is calculated by recosting the 1982-83 level of activities at 1984-85 costs, dividing these costs into the corresponding 1984-85 figures, multiplying by 100 and subtracting 100 from the result. The Total % Real Increase shown in Table 4.1 was derived by recosting and summing all individual items as described above.

### 2.2.4 Establishing the Budget Level

Based on the reports of JCB(4) and JCB(5) and an analysis of funds likely to be available, the Standing Committee decided that the maximum level of the budget for the 1984-85 biennium should be nominally the same, in real terms, as that for the 1982-83 biennium. The proposed budget for the 1984-85 biennium follows that principle.

As can be noted in Figure 1 below, although the budget for 1984-1985 is 8.2 per cent higher than the approved budget in the previous biennium, the increase in real terms is only 0.2%. (See also para 2.3.3 and Table 4.1.)

Figure 1. Relationships among 1982-83 approved budget, budget required in 1984-85 to maintain same level, and budget proposed for 1984-85.



2.3 Presentation

2.3.1 Format

This Programme Budget follows the same general format as in previous years, except that Part 8 of the 1982-83 Programme Budget has been amalgamated into Part 3 of the Programme Budget proposed for 1984-85.

Part 7 presents Programme Area IV, Programme Management.

2.3.2 Content

The Programme Budget tables include the JCB-approved budget (including staffing levels) for the 1982-83 biennium and the Programme Budget for the 1984-1985 biennium as recommended by STAC(5) and proposed by the Standing Committee and Director, TDR. The projections for 1986-87 are based on the guidance of STAC(5) for Areas II and III and the Standing Committee for Areas I and IV. These estimates must be considered as preliminary.

The costs of individual activities have been rounded to the nearest US\$ 1 000; therefore, there may be small differences between totals shown and the sum of the items in a specific column.

Where information is expressed as a percentage of the total, the total is 100 - even if rounding results in an apparent discrepancy.

The term "obligations" as used throughout TDR financial and budget presentations denotes:

- funds disbursed,
- funds for which the Executing Agency is legally obligated (e.g. contracts for services by institutions that have been signed by the Executing Agency), or

Part 1 is a General Programme Summary.

Part 2 describes the way in which the Programme Budget was developed and explains the presentation, including the assumptions made.

Part 3 includes various analyses and observations on the proposed budget.

Part 4 presents summary tables for the four Programme Areas.

Part 5 presents descriptive summaries of the progress and plans and the budget tables for the components of Programme Area II, Research and Development.

Part 6 presents a description of progress and plans and budget tables for Programme Area III, Research Capability Strengthening.

- in respect to staff contracts, obligations for the current financial year.

### 2.3.3 Staff

The total number of professional staff years proposed is decreased by two and one half from that approved for 1982-83. The decrease in staff is a medical officer (two years) and one year of a Technical Officer in Research and Development. The increase in Programme Management is for one-fourth share of the salary and allowances of a Patent Attorney in the Office of the Legal Counsel (one-half year).

The increase in support staff is for a half-time secretary to deal with TDR matters in Research and Development and to regularize a temporary post in Programme Management (Communications).

3. OBSERVATIONS

3.1 General

The budget projections for the 1984-85 biennium made to JCB(4) in December 1981, were US\$ 70.6 million. Following a review of the level of funds likely to be available, the Standing Committee revised this to US\$ 66.7 million, a decrease of 5.5 per cent. The initial projection for 1986-87 is US\$ 73.0 million but some activities may reach a stage of development during that period (especially field trials of drugs and vaccines) which, if they are to be followed through, will require upward revision of the projection if other activities are not to be curtailed.

3.2 Contributions

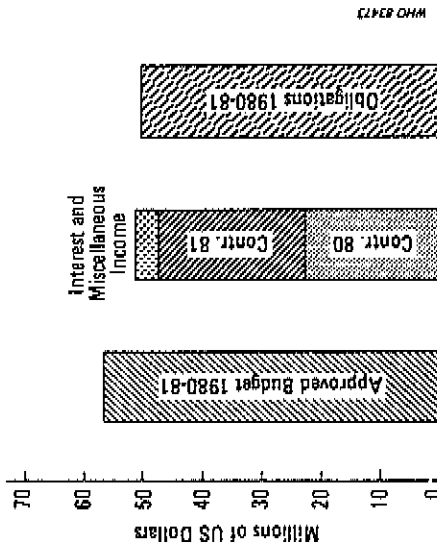
3.2.1 Pattern of Contributions

The bar graph below (Figure 2) shows the level of contributions from 1979 (when the Programme reached its current operational level) to the end of 1982. Two things

Figure 2. Contributions in actual dollars (clear areas) & in 1979 dollars (shaded areas)



Figure 3. Approved budget, income, and obligations in 1980-81



shortfall in income resulted in a scaling down of Programme operations. (Refer also to table 3.1.)

Although the budgets from 1980 onward have been of the 'zero growth' variety - rising only to offset inflationary pressures - the level of contributions has not reached the level of the approved budget. During 1980, a combination of tight financial control, carryover from previous years, and other income (interest and miscellaneous) minimized the effects of the shortfall; but, beginning in 1981, the funds made available for Programme Operations (i.e. contracts to national institutions) had to be cut back.

If the contributions to the Programme in 1983 are at

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can be noted: The actual level from one year to the next and the level in 'real' terms (i.e., in 1979 US dollars, assuming a 10 percent annual decrease in purchasing power). In the years 1979 to 1981, there was a small annual increase in the level of contributions although the value in 1979 dollars actually decreased. In 1982 there was, for the first time, a decrease both in the level and the value of contributions as compared to the previous year.

### 3.2.2 Approved Budget, Income, and Obligations

Figure 3 shows that, during the 1980-81 biennium, the funds available to TDR (i.e. contributions plus interest and miscellaneous income) did not reach the approved budget level. As mentioned previously, this situation had been predicted in 1980 and JCB(3) approved a financial management plan which was continued by JCB(4) and JCB(5). Under the terms of the plan, the Director of the Special Programme revises approved budget levels to meet available resources.

The success in the implementation of this plan can be seen by the fact that the level of obligations was almost identical to that of the Programme income. It should be borne in mind that, however successful the financial management plan was in meeting the difficulties, the

the same level as in 1982, the shortfall in income could require additional cutbacks in operations. This would have a serious impact on the effectiveness of TDR in both its ability to bring the development of promising products to the stage of application and in its credibility in the international scientific community.

### 3.2.3 Exchange Rate Losses

Exchange rate instability has also had a negative effect on the funds available to the Special Programme. An attempt to assess the impact of exchange rate fluctuations in 1981 and 1982 was made as follows.

For those major donors who contributed in their own currency in the previous year, the dollar equivalent was calculated for each year using the exchange rate used on conversion into dollars in the previous year (viz. in 1980 and/or 1981, as applicable).

The value actually received was subtracted from what would have been received at the exchange rate of the previous year, to establish an estimate of the direct losses in income to TDR from one year to the next. The loss thus derived from 1980 to 1981 was some US\$ 700 000; and from 1981 to 1982, in the order of US\$ 1 000 000.

These substantial losses seem likely to continue for the foreseeable future, unless the exchange rate of the US dollar against other major currencies reverses direction. The uncertainty as to the expected level of income would be diminished if pledges could be expressed in US dollars and the contribution made in US dollars or in sufficient national currency to achieve the pledged level in US dollars using the exchange rate operating at the time of the actual transfer of funds.

3.3 Programme Balance

Two major important indicators of the balance of Programme activities are by Programme Area and by budget elements.

3.3.1 Budget Elements

The four Programme Areas correspond to the organization of TDR, and the Programme Budget is structured accordingly. However, the four Areas include similar "budget elements" (or activities) which are important in the analysis of the Budget. For this reason, the following such elements are presented in Table 3.1 for 1980-81 (both as approved by the JCB and the actual obligations), 1982-83 (the JCB approved budget) and 1984-85 (as proposed):

Operations: the Programme's Research and Development, Research Training and Institution Strengthening projects. These are funded through Technical Services Agreements, Research Training Grants or other similar contracting instruments to institutions and scientists.

Personnel Services: the Programme Secretariat (WHO staff) including overtime and staff engaged on a temporary basis. This does not include WHO field staff participating in approved projects in the field.

Consultants: honoraria, travel and per diem costs for scientists assisting in Programme implementation, operations and evaluation.

Duty Travel: Secretariat travel costs associated with the management of the Programme.

Others:

Information Systems services - primarily electronic data processing, data analysis, and services;

Scientific and Public Information - the production of the Programme Newsletter, the Programme Report, other Programme documents, audio-visual material and other activities related to the transfer of scientific information and the promotion of the activities of the Programme;

Common services - postage, telephone, telex, photocopying and the charges for the premises occupied by the Special Programme;

Administrative support - services provided by the Office of the Legal Counsel and the Budget,

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Meetings: meetings of the JCB, STAC, SGCs, SMC Steering Committees, RSG, its Executive Sub-Group, and SMC meetings for specific purposes, e.g. the planning of an international clinical trial protocol.

Finance, Personnel, Supplies and Conference Services units in WHO; and Supplies and equipment.

3.3.2 Programme Areas

The charts below indicate the budget levels of the four Programme Areas in 1980-81 (JCB approved), 1982-83 (JCB approved) and 1984-85 (proposed). The actual obligations in 1980-81 by Programme Area are also indicated.

Management and review activities of the Programme (Programme Areas I and IV) are stable at between 9 and 10 percent. The JCB(5)-recommended growth of Programme Area

III activities to between 25 and 30 percent of the budget is being achieved through a nominal one percent increase from one biennium to the next. Actual Obligations to Research Capability Strengthening were 25.5% of total obligations in the 1980-1981 biennium.

In viewing the proportions of actual obligations for 1980-81, it must be remembered that the shortfall in contributions made the actual amounts less. (Actual obligations in 1980-81 were 88.5 percent of the approved budget.)

Figure 4. Programme Balance by Programme Area

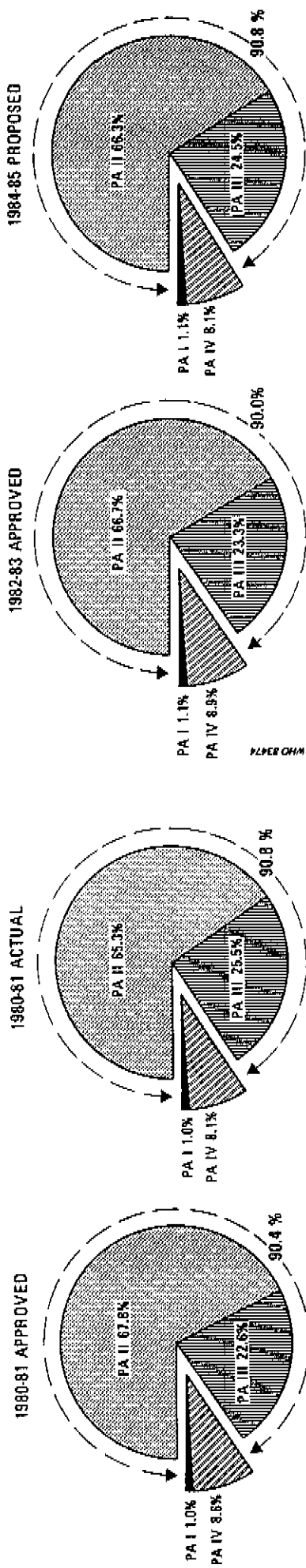


Table 3.1 SUMMARY OF COST BY BUDGET ELEMENTS 1980-1985 (in US\$ 1000)

BUDGET ELEMENT	1980-81				1982-83		1984-85	
	Approved 1		Actual 2		Approved 3		Proposed 4	
	\$	% of Total	\$	% of Total	\$	% of Total	\$	% of Total
Operations	41 482	73.2	38 578	76.9	44 465	72.1	49 835	74.7
Meetings	2 786	4.9	1 902	3.8	3 147	5.1	3 222	4.8
Programme Area I	595	1.0	515	1.0	685	1.1	719	1.1
Personnel Services	8 237	14.5	6 733	13.4	8 879	14.4	9 140	13.7
Consultants	1 346	2.4	626	1.2	1 130	1.8	1 062	1.6
Duty Travel	769	1.4	470	0.9	1 004	1.6	974	1.5
Other	1 492	2.6	1 352	2.7	2 333	3.8	1 749	2.6
TOTAL	56 707	100.0	50 176	100.0	61 643	100.0	66 701	100.0

4. SUMMARY TABLES

The six tables in Section Four provide a summary of the programme budget over three biennia:

1982-1983 - the budget as approved by JCB(4)

1984-1985 - the budget as proposed by the Standing Committee and Director, TDR

1986-1987 - the preliminary estimates of budget levels derived from information available at 1 April 1983

Tables 4.1 and 4.2 present the budget and staff of the Programme by its four Areas:

- Area I - Technical and Administrative Bodies
- Area II - Research and Development
- Area III - Research Capability Strengthening
- Area IV - Programme Management

Table 4.3 presents the budget of Area I, while Tables 4.4, 4.5 and 4.6 summarize Areas II, III and IV respectively.

The budget details for Programme Areas II, III and IV can be found in sections five, six and seven which follow the summary tables.

SUMMARY 1982 - 1985

Table 4.1 PROGRAMME BUDGET

PROGRAMME AREA	OBLIGATIONS (in US\$ 1 000)				
	1982-83	1984-85			1986-1987
	Approved	Proposed	% Increase	% Real Increase	Estimated
I. Technical and Administrative Bodies	685	719	5.0	3.6	791
II. Research and Development	41 147	44 204	7.4	(1.5)	48 344
III. Research Capability Strengthening	14 337	16 342	14.0	4.7	17 976
IV. Programme Management	5 474	5 436	(0.7)	0.6	5 885
TOTAL	61 643	66 701	8.2	0.2	72 996

## SUMMARY 1982 - 1985

Table 4.2 TOTAL PROGRAMME STAFF REQUIREMENTS

PROGRAMME AREA	STAFF REQUIREMENTS (in Staff years/months)		
	1982-83 Approved P* GS**	1984-85 Proposed P GS	1986-87 Estimated P GS
I. Technical and Administrative Bodies	-	-	-
II. Research and Development	38	35	35
III. Research Capability Strengthening	10	10	12
IV. Programme Management	24	24/6	48
TOTAL	72	69/6	95

\* P - Professional Staff

\*\* GS - General Services Staff

SUMMARY 1982-1985

Table 4.3 PROGRAMME AREA I: TECHNICAL AND ADMINISTRATIVE BODIES

COMPONENTS	OBLIGATIONS				IN US\$ 1 000)		
	1982-83	1984-85		1986-87			
	Approved	Proposed	% Increase	% Real Increase	Estimated		
Joint Coordinating Board (JCB)	92	131	42.4	21.3	144		
Quinquennial Review	50	-	(100)	-	-		
Standing Committee	35	38	8.6	0	42		
Fundraising Activities	150	100	(33.3)	(39.4)	110		
Scientific and Technical Advisory Committee (STAC)	127	210	65.4	50.0	231		
In-depth Programme Reviews by STAC	231	240	3.9	(4.0)	264		
<b>TOTAL</b>	<b>685</b>	<b>719</b>	<b>5.0</b>	<b>3.6</b>	<b>791</b>		

## SUMMARY 1982 - 1985

Table 4.4 PROGRAMME AREA II: RESEARCH AND DEVELOPMENT

COMPONENTS	OBLIGATIONS				(in US\$ 1 000)	
	1982-83		1984-85		1986-87	
	Approved	Proposed	% Increase	% Real Increase	Estimated	
General Activities	2 834	2 495	(12.0)	(17.5)	2 743	
Malaria	9 920	11 320	14.1	4.3	12 411	
Schistosomiasis	3 739	3 715	(0.6)	(9.3)	4 087	
Filariasis	4 250	4 250	0	(8.8)	4 688	
African Trypanosomiasis	3 961	3 934	(0.7)	(9.5)	4 328	
Chagas' Disease	2 000	1 976	(1.2)	(9.4)	2 154	
Leishmaniasis	2 053	2 053	0	(8.4)	2 289	
Leprosy	4 582	5 872	28.2	17.4	6 392	
Biomedical Sciences	1 563	1 353	(13.4)	(20.3)	1 488	
Vector Biology and Control	2 177	2 550	17.1	8.4	2 716	
Epidemiology	2 399	2 536	5.7	(3.2)	2 770	
Social and Economic Research	1 669	2 150	28.8	18.3	2 278	
<b>TOTAL</b>	<b>41 147</b>	<b>44 204</b>	<b>7.4</b>	<b>(1.5)</b>	<b>48 344</b>	

SUMMARY 1982 - 1985

Table 4.5 PROGRAMME AREA III: RESEARCH CAPABILITY STRENGTHENING

COMPONENTS	OBLIGATIONS (in US\$ 1 000)				
	1982-83	1984-85			1986-87
	Approved	Proposed	% Increase	% Real Increase	Estimated
General Activities	1 983	2 055	3.6	1.6	2 260
Institution Strengthening Activities	6 976*	7 858	12.6	2.4	8 644
Training Activities	5 378*	6 429	19.5	8.7	7 072
TOTAL	14 337	16 342	14.0	4.7	17 976

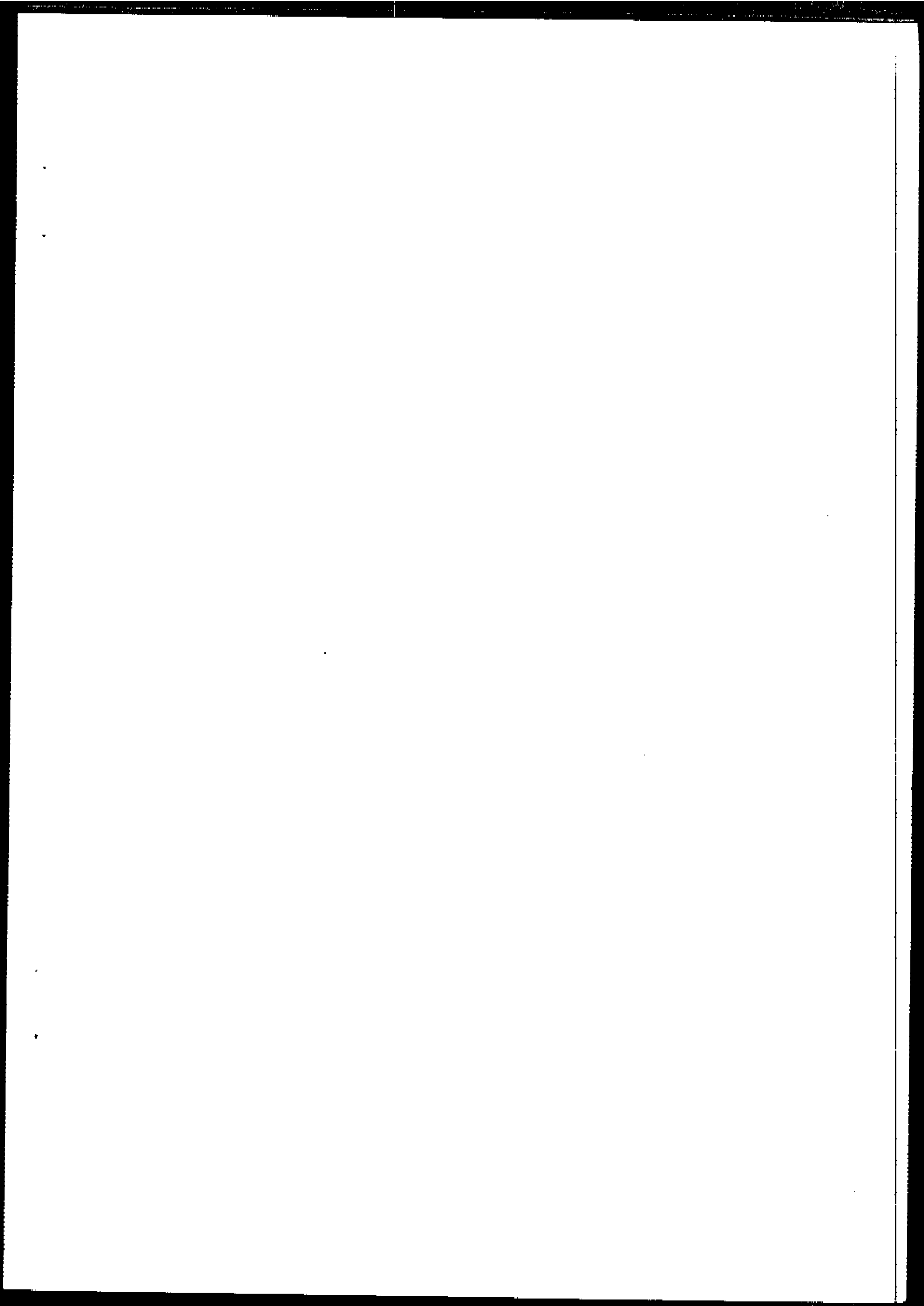
\* The 1982-83 Operations budget was originally allocated as Institution Grants \$ 7 900 and Training \$ 4 454; these were subsequently reallocated as indicated in the table.

SUMMARY 1982 - 1985

Table 4.6 PROGRAMME AREA IV: PROGRAMME MANAGEMENT

DESCRIPTION	OBLIGATIONS (in US\$ 1 000)				
	1982-83	1984-85			1986-87
	Approved	Proposed	% Increase	% Real Increase	Estimated
Office of the Programme Director	3 155	3 180	0.8	(1.6)	3 501
Regional Offices	833	956	14.8	0	1 053
Administrative Support Costs*	574	510	(11.2)	9.4	513
Common Services and Accommodations	912	790	(13.4)	n.a	818
TOTAL	5 474	5 436	(0.7)	0.6	5 885

\* Includes 25% of the salary and allowances of a Patent Attorney in the Office of the Legal Counsel.



## 5. PROGRAMME AREA II - RESEARCH AND DEVELOPMENT

### 5.1 General Activities

During the reporting period, each SWG, through its Steering Committee, continued to implement the strategic plan to achieve its objectives. STAC reviews these plans annually and they are revised as required. The activities of each SWG and the Research Strengthening Group are reviewed "in-depth" by STAC every four years using the Scientific and Technical Review Committee (STRC) mechanism. STAC(5) recommendations as to Programme balance, scope, and focus of individual SWGs are reflected in the Programme budget proposed for the 1984-85 biennium.

Resources available during 1982 and the early part of 1983 have restricted Programme operations somewhat, although to the maximum extent possible the shortage of funds was met by economies in programme management, duty travel, meetings and use of consultants.

The number of individual projects supported in Programme Area II is shown below, by disease and trans-disease component from Programme inception in 1976, to 31 December 1982. A project which is funded and renewed is counted as one project.

Director's Initiative Fund	77	Leishmaniases	98
Malaria	243	Leprosy	139
Schistosomiasis	128	Biomedical Sciences	38
Filariasis	116	Vector Biology and Control	86
African Trypanosomiasis	91	Epidemiology	18
Chagas' Disease	91	Social and Economic Research	50

Total number of projects: 1175

## PROGRAMME AREA II: RESEARCH AND DEVELOPMENT

Table 5.1 GENERAL ACTIVITIES

DESCRIPTION	OBLIGATIONS					(in US\$ 1 000)	
	1982-83	1984-85			1986-87		
	Approved	Proposed	% Increase	% Real Increase	Estimated		
Personnel Services	588	348	(40.8)	(37.2)	347		
Director's Initiative Fund	600	600	0	(9.1)	660		
Consultants	930	826	(11.2)	(29.3)	926		
Duty Travel	519	488	(6.0)	(24.5)	554		
Publications	152	184	21.1	10.2	202		
Operational Support Fund	12	13	8.3	0	14		
Shipping and Insurance Cost Adjustments	33	36	9.1	0	40		
TOTAL	2 834	2 495	(12.0)	(17.5)	2 743		

## RESEARCH AND DEVELOPMENT

5.2 MALARIA

Research and Development is carried out by three SWGs concerned respectively with chemotherapy (CHEMAL), immunology (IMMAL) and field research (FIELDMAL). The groups coordinate their activities closely.

5.2.1 Summary of Activities

There has been a significant increase of malaria since 1979, and the development and spread of parasite resistance to chloroquine and to sulfonamide-pyrimethamine combinations poses a threat to the lives of millions of people.

CHEMAL aims to develop new drugs, improve drug delivery systems and standardize and introduce methods for the assessment of the drug sensitivity of malaria parasites. The clinical testing of the new antimalarial drug mefloquine has been completed. Phase I clinical trials of the mefloquine-sulfadoxine-pyrimethamine combination have also been completed, and Phases II and III trials have started. A candidate compound of an entirely new class of antimalarials, artesunate (a derivative of Qinghaosu) has been selected for preclinical and clinical development, and this is being pursued actively.

Macro- and micro-test systems for the assessment of chloroquine, amodiaquine, quinine and mefloquine sensitivity of *P. falciparum* in vitro have been developed and validated. These tests are ready for large-scale field trials.

Vaccine development under IMMAL emphasizes immunization based on one or more defined antigens. Promising

antigens have been identified, and methods of production using genetic engineering or synthetic approaches are being explored.

FIELDMAL has established a system for monitoring the response to drugs of *P. falciparum* throughout the South-East Asia and Western Pacific Regions of WHO and has made progress in implementing such a monitoring system in the African, American and Eastern Mediterranean Regions. FIELDMAL has also implemented a field trial of mefloquine and primaquine in South-East Asia. Immunodiagnostic tests are being developed and validated in association with IMMAL.

5.2.2 Major Planned Activities for the 1984-85 Biennium

CHEMAL will complete outstanding mefloquine trials and Phase II and III trials of mefloquine-sulfadoxine-pyrimethamine. Toxicological studies will be undertaken on selected derivatives of Qinghaosu. Research for other new antimalarial drugs will continue.

IMMAL will continue several lines of research related to vaccine development through definition of protective antigens, their purification and production, and the study of immune mechanisms. The group will also apply standardized reagents to serological diagnostic tests.

FIELDMAL will be concerned with research on tools and strategies to improve malaria control in the field, including studies on vectors, drugs and drug resistance and optimal control strategies. Training of scientists will be emphasized.

## PROGRAMME AREA II: RESEARCH AND DEVELOPMENT

Table 5.2 MALARIA

DESCRIPTION	OBLIGATIONS				(in US\$ 1 000)	
	1982-83		1984-85		1986-87	
	Approved	Proposed	% Increase	% Real Increase	Estimated	
(a) PLANNING AND EVALUATION						
1. Personnel Services	863	839	(2.8)	0	923	
2. Meetings	593	631	6.4	(9.9)	693	
Total (a)	1 456	1 470	1.0	(4.5)	1 616	
(b) OPERATIONS						
<u>SWG</u>						
1. CHEMAL*	4 140	4 650	12.3	2.1	5 115	
2. IMMAL	2 500	3 400	36.0	23.6	3 700	
3. FIELDMAL	1 824	1 800	(1.3)	(10.3)	1 980	
Total (b)	8 464	9 850	16.4	5.8	10 795	
GRAND TOTAL	9 920	11 320	14.1	4.3	12 411	

\* Includes cost of Field Staff: 1982-83 = US\$ 60 000 per year; 1984-85 = US\$ 64 600 per year.

RESEARCH AND DEVELOPMENT

5.3 SCHISTOSOMIASIS

Research on schistosomiasis is conducted under one SWG.

5.3.1 Summary of Activities

Applied field research: Projects supported by the SWG are evaluating control tactics which may contribute to the overall strategy of control of morbidity in schistosomiasis. Training in field research also has been expanded.

Epidemiology and Snail Control: Two new quantitative diagnostic techniques for S. haematobium infection have been developed. It was not found possible to induce resistance of snails to molluscicides in the laboratory, but evaluation of resistance in natural snail populations which have experienced long-term exposure is now required.

Chemotherapy and Biochemistry: Resistance to currently used antischistosomal drugs may become an operational problem since resistance to two commonly used drugs, oxamniquine and hycanthon, can be induced in the laboratory.

Several candidate antigens for immunodiagnosis and vaccine development have been identified.

Two anti-schistosome monoclonal antibodies have been produced. Antigens isolated with these monoclonal antibodies are being evaluated in immunodiagnostic tests and for protection of experimental animals against infection.

S. mansoni and S. japonicum worm antigens have now been supplied to over 40 different laboratories, and soluble S. mansoni egg antigen (SEA) has recently been made available.

5.3.2 Planned activities for the 1984-1985 biennium

The SWG will continue its current lines of research with particular emphasis on applied field research, the improvement of control strategies, and the standardization of diagnostic tests.

A collaborative study on S. japonicum antigens for immunodiagnosis will be undertaken jointly with the Edna McConnell Clark Foundation in 1983-1984.

An SWG meeting on the Biochemistry and Chemotherapy of Schistosomiasis, emphasizing the new biochemical findings and mode of action studies, will be held in 1984.

An SWG meeting on basic science aspects of schistosomes will be held in 1985.

PROGRAMME AREA II: RESEARCH AND DEVELOPMENT

Table 5.3 SCHISTOSOMIASIS

DESCRIPTION	OBLIGATIONS (in US\$ 1 000)					
	1982-83		1984-85		1986-87	
	Approved	Proposed	% Increase	% Real Increase	Estimated	
(a) PLANNING AND EVALUATION						
1. Personnel Services	246	238	(3.3)	0	262	
2. Meetings	204	188	(7.8)	(21.9)	207	
Total (a)	450	426	(5.3)	(11.1)	469	
(b) OPERATIONS						
<u>SWG</u>						
Schistosomiasis	3 289	3 289	0	(9.1)	3 618	
Total (b)	3 289	3 289	0	(9.1)	3 618	
GRAND TOTAL	3 739	3 715	(0.6)	(9.3)	4 087	

## RESEARCH AND DEVELOPMENT

5.4 FILARIASIS

Research on filariasis covers both lymphatic filariasis and onchocerciasis and the SWG on Filariasis coordinates its activities with the Onchocerciasis Chemotherapy Project. The SWG's goals are: to obtain better filaricides, to reduce inflammatory reactions to dead worms, to develop better immunodiagnostic tests, to improve methods of vector control, and if possible, to develop vaccines.

5.4.1 Summary of Activities

Further clinical trials with flubendazole and mebendazole have confirmed embryostatic activity in onchocerciasis and lymphatic filariasis and suggested a possible macrofilaricidal effect on lymphatic parasites. Dosage schedules for the improved use of DEC-C and suramin in onchocerciasis and of DEC-C in lymphatic infections have been developed. The prophylactic effect of DEC-C in lymphatic infections confirmed in the monkey-B. malayi model is being tested in humans. Several new compounds have been synthesized on a lead-directed basis. Some benzimidazole derivatives and some coded compounds provided by industry appear promising.

More than 50 compounds have shown some activity in the various screens, and 13 of these have been selected for further testing. Ivermectin - identified earlier in primary and secondary screens as a microfilaricide and prophylactic - has been confirmed as a prophylactic in the cattle-Onchocerca screen.

Excretory-secretory and surface antigens are being assessed for use in immunodiagnosis. Monoclonal antibodies have been produced and tests for detection of antibodies

and circulating antigens are being developed.

A successful in vitro culture technique for B. malayi and B. pahangi from infective larvae to the young adult stage has opened the way for progress in chemotherapeutic and immunological studies of all filarial parasites.

Information has been obtained on the population and transmission dynamics of the vectors of onchocerciasis in Congo and Sudan and of the Mansonia vectors of lymphatic infections in Thailand, Indonesia and Malaysia.

5.4.2 Planned Activities in the 1984-85 Biennium

Toxicological and other tests will be undertaken of several of the promising chemotherapeutic compounds.

Studies on the synthesis, screening and metabolism of promising leads will take place, with emphasis on the benzimidazoles and their derivatives.

Antigen studies will be continued mainly for sero-diagnostic purposes. Monoclonal antibodies produced in various laboratories will be compared and standardized.

Epidemiological and vector studies will be undertaken in different local situations. Where necessary, Phase I and Phase II trials of drugs such as mebendazole and flubendazole will be organized.

It is hoped that a promising drug(s) and/or antigen(s) for serodiagnosis will become available for field trials. It is also hoped to use knowledge gained from immunopathological studies in attempts to reduce reactions to the parasites.

PROGRAMME AREA II: RESEARCH AND DEVELOPMENT

Table 5.4 FILARIASIS

DESCRIPTION	OBLIGATIONS				(in US\$ 1 000)			
	1982-83	1984-85	1984-85	1986-87	Proposed	% Increase	% Real Increase	Estimated
(a) PLANNING AND EVALUATION								
1. Personnel Services	246		238			0		262
2. Meetings	204		212			(3.3)	(12.0)	256
Total (a)	450		450			0	(6.1)	518
(b) OPERATIONS								
<u>SMC</u>								
Filariasis	3 800		3 800			0	(9.1)	4 170
Total (b)	3 800		3 800			0	(9.1)	4 170
GRAND TOTAL	4 250		4 250			0	(8.8)	4 688

## 5.5 AFRICAN TRYPANOSOMIASIS

Research on African trypanosomiasis is handled by one SWG, with the broad objectives of improvement in disease control through better methods of vector control, diagnostic tests, drugs and clinical management.

standardize reagents, including antigens and monoclonal antibodies.

### 5.5.2 Planned Activities for the 1984-85 Biennium

#### 5.5.1 Summary of Activities

New Glossina traps have been developed and an insecticide-impregnated monoclonal trap that is simpler and cheaper to make than the biconical trap, has been found to be effective. Conventional agricultural ground-spray equipment has been found to be effective for the application of synthetic pyrethroids at very low doses for Glossina control in transitional forest areas. Existing parasitological tests for diagnosis are insensitive and promising new methods are being evaluated.

In the search for improved chemotherapy, over 100 compounds have been passed through primary screens. Combinations of difluoromethyl-ornithine (DFMO) and Bleomycin appear promising in a mouse model. However high doses are required and a search for more suitable analogues is in progress. The therapeutic use of arsenical compounds is being reviewed, and trials have been planned with smaller doses in the hope of reducing the risk of cerebral complications.

Research to improve serodiagnostic tests includes the search for trypanosome antigens in serum. A serum bank has been established, and a workshop has been held to

#### (i) Epidemiology

The three long-term studies on disease due to T.b. gambiense and T.b. rhodesiense infections will be continued. Systems for parasite detection, isolation and specific identification will be explored. Knowledge of the animal and human disease reservoirs will be expanded; factors influencing the transmission cycle and vector habits will be studied; and methods of vector control will be improved.

#### (ii) Chemotherapy

Pharmacokinetic studies and the screening of various agents will continue. The mechanism of action of chemotherapeutic agents on the host and parasite will be explored further and safety and effectiveness studies will be begun for appropriate drugs.

#### (iii) Immunology and Pathology

Research for simple and effective immunodiagnostic tests will continue. The causes of inflammatory reactions to the infection in man will be studied and the possibility of blocking these will be explored.

## PROGRAMME AREA II: RESEARCH AND DEVELOPMENT

Table 5.5 AFRICAN TRYPANOSOMIASIS

DESCRIPTION	OBLIGATIONS				(in US\$ 1 000)	
	1982-83		1984-85		1986-87	
	Approved	Proposed	% Increase	% Real Increase	Estimated	
(a) PLANNING AND EVALUATION						
1. Personnel Services	246	238	(3.3)	0	262	
2. Meetings	299	280	(6.4)	(20.7)	308	
Total (a)	545	518	(5.0)	(12.4)	570	
(b) OPERATIONS						
SWG						
African Trypanosomiasis*	3 416	3 416	0	(9.1)	3 758	
Total (b)	3 416	3 416	0	(9.1)	3 758	
GRAND TOTAL	3 961	3 934	(0.7)	(9.5)	4 328	

\* Includes cost of Field Staff: 1982-83 = US\$ 190 000 per year; 1984 = US\$ 123 700 and 1985 = US\$ 71 100.

## 5.6 CHAGAS' DISEASE

Research on Chagas' disease is conducted under one SWG. The SWG has taken note of research underway outside the Programme and its research plan emphasizes identification of gaps in research conducted under other auspices, and the standardization of methods, techniques and materials.

### 5.6.1 Summary of Activities

A serum reference bank is now providing standardized serum samples to laboratories throughout Latin America. During 1982, a total of 1000 samples was distributed to 14 laboratories in six countries. Protocols for the standardization of serodiagnostic techniques have been developed, and collaboration has been established among laboratories in Argentina, Brazil, Colombia, Costa Rica and the United States of America.

A simple automated test for screening for infection in "banked" blood has been developed, and initial results are promising. A simple and inexpensive test for the screening of compounds to sterilize blood intended for transfusion also has been developed.

Restriction endonuclease finger-printing of kinetoplast-DNA promises to provide a valuable new tool for epidemiological and clinical purposes. New subdivisions (schizodemes) within the same zymodeme of a T. cruzi strain can be demonstrated using this method.

Passive protection of mice with three defined anti-T. cruzi monoclonal antibodies has been reported. The discovery of a monoclonal antibody which identifies common epitopes in T. cruzi epimastigotes and neurones provides a new lead in studies of the immunopathology of Chagas' disease.

### 5.6.2 Planned Activities for the 1984-85 Biennium

Research work for 1984-85 will continue along the present lines with emphasis on research coordination and standardization of research methods. The network of collaborative laboratories for standardization of serodiagnosis will be expanded.

Emphasis also will be placed on studies on behavioural, metabolic and physiological patterns of vectors. The identification of parasite antigens involved in protective immunity by the use of techniques such as hybridoma, recombinant DNA and T lymphocyte cloning will be given high priority. Collaborative projects using a standard protocol to evaluate animal models will also receive priority.

A course on the biology of T. cruzi will be offered in an institution in Brazil in collaboration with BIOS and the RSG. In this way it is hoped to assure the transfer of the new techniques in genetic engineering and molecular biology to institutions in endemic countries.

PROGRAMME AREA II: RESEARCH AND DEVELOPMENT

Table 5.6 CHAGAS' DISEASE

DESCRIPTION	OBLIGATIONS					(in US\$ 1 000)	
	1982-83		1984-85		1986-87		
	Approved	Proposed	% Increase	% Real Increase	Estimated		
(a) PLANNING AND EVALUATION							
1. Personnel Services	246	238	(3.3)	0	262		
2. Meetings	154	138	(10.4)	(24.2)	152		
Total (a)	400	376	(6.0)	(10.5)	414		
(b) OPERATIONS							
<u>SWG</u>							
Chagas' Disease	1 600	1 600	0	(9.1)	1 740		
Total (b)	1 600	1 600	0	(9.1)	1 740		
GRAND TOTAL	2 000	1 976	(1.2)	(9.4)	2 154		

## 5.7 LEISHMANIASIS

Research on this group of diseases is conducted under one SWG with sections on chemotherapy, epidemiology and immunology.

### 5.7.1 Summary of Activities

Information has continued to accumulate on the prevalence and distribution of human leishmaniasis and on the structure of major foci. Comprehensive and detailed maps of the distribution of the various species and sub-species affecting man have been prepared. Detailed tables of aetiologic agents, forms of the disease in man and known or suspected vectors and reservoirs for all macrofoci are now available. Additional facilities for biochemical identification of parasites have been established in Algeria and Peru; however a large number of isolates from many parts of the world remain to be identified. The first example of acquired resistance to antimonials has been documented.

A standard protocol has been prepared for clinical trials of new drugs for leishmaniasis. Through close collaboration among investigators working within and outside the Programme and with industry, three new compounds or preparations have been developed which are now under consideration for human trials.

A plan of research and priorities for a vaccine development programme has been prepared.

### 5.7.2 Planned Activities for the 1984-85 Biennium

By 1984 the number of field research projects determining prevalence and epidemiological structures in individual foci will be reduced substantially. Long-term field research projects are planned in localities representative of the major areas of the visceral, cutaneous, and mucocutaneous forms of the disease. These will be structured to study all aspects of the epidemiology and ecology of the disease.

Methods to distinguish between the species and subspecies of parasites causing cutaneous leishmaniasis in both the Old and New World are now available and a programme to identify isolates and map the distribution of aetiologic agents in both hemispheres should reach full operation.

Clinical trials of new antileishmanials will have priority in chemotherapy research, and three new compounds or preparations may be available for testing. Two of these are to be tested against visceral leishmaniasis, of which one also would be tested against New World cutaneous leishmaniasis. A topical preparation may be tested against Old World cutaneous leishmaniasis. Success in these early trials could lead to their extension and to trials against other Leishmania species and other forms of clinical disease.

Research on vaccine development for leishmaniasis will be intensified.

PROGRAMME AREA II: RESEARCH AND DEVELOPMENT

Table 5.7 LEISHMANIASIS

DESCRIPTION	OBLIGATIONS (in US\$ 1 000)				
	1982-83	1984-85		1986-87	
	Approved	Proposed	% Increase	% Real Increase	Estimated
(a) PLANNING AND EVALUATION					
1. Personnel Services	246	238	(3.3)	0	262
2. Meetings	207	215	3.9	(11.9)	267
Total (a)	453	453	0	(6.0)	529
(b) OPERATIONS					
<u>SMG</u>					
Leishmaniasis	1 600	1 600	0	(9.1)	1 760
Total (b)	1 600	1 600	0	(9.1)	1 760
GRAND TOTAL	2 053	2 053	0	(8.4)	2 289

## RESEARCH AND DEVELOPMENT

5.8 LEPROSY

Leprosy research is carried out under two SWGs concerned with immunology (IMMLEP) and chemotherapy (THELEP), respectively.

5.8.1 Summary of Activities

(a) Highlights of progress in immunology include:

- a batch of purified killed M. leprae has been produced in licensed premises for use in man and plans are well advanced for sensitization studies; and
- four large-scale BCG vaccination trials have been analysed for efficacy against leprosy.

(b) Highlights of progress in therapy include:

- Surveys of dapsone resistance. Survey of secondary dapsone resistance were made in three localities. Two showed a prevalence of a high degree of resistance (86 and 95 per 1 000) while the third showed a prevalence of 48 per 1 000. Surveys of primary dapsone resistance have also been made; studies in Chingleput (India) and Bamako (Mali), among untreated patients recruited for clinical trials, have yielded the very high figures of 300 and 375 per 1 000.
- Trials of multidrug regimens. Clinical trials and field trials are making satisfactory progress. A short-term trial comparing ethionamide and prothionamide at two dosage levels has begun. The protocol on trials in non-lepromatous leprosy has been finalized and applications to participate have been invited from suitable centres.

5.8.2 Planned Activities in the 1984-85 Biennium

## (a) Immunology (IMMLEP)

- Isolation and characterization of individual M. leprae-specific antigens by both conventional and by genetic engineering technology to provide specific skin test and serological reagents.
- Establishment of a bank for serum and antibodies.
- Application of skin testing and serological techniques, using improved reagents, to epidemiological studies, particularly to identify early infection.
- Initiation of small pre-vaccine field studies on the ability of killed M. leprae to induce skin sensitization in man, and on the effectiveness of killed M. leprae, with or without BCG, to induce cell-mediated immunity in relation to therapy, and to immunoprophylaxis.

## (b) Therapy (THELEP)

- Continued surveys of primary dapsone resistance. The clinical and field trials on lepromatous leprosy will be continued.
- Attempts to establish another model of lepromatous disease will be pursued. New studies on the efficacy of intermittently administered ethionamide and prothionamide and on the human pharmacology of clofazimine will be undertaken.
- Development of new drugs will receive high priority.

PROGRAMME AREA II: RESEARCH AND DEVELOPMENT

Table 5.8 LEPROSY

DESCRIPTION	OBLIGATIONS (in US\$ 1 000)				
	1982-83		1984-85		1986-87
	Approved	Proposed	% Increase	% Real Increase	Estimated
(a) PLANNING AND EVALUATION					
1. Personnel Services	392	428	9.2 (10.0)	17.9 (23.8)	470
2. Meetings	360	324			290
Total (a)	752	752	0	(4.6)	760
(b) OPERATIONS					
<u>SWG</u>					
IMMLEP	2 280	3 320	45.6	32.4	3 652
THELEP	1 550	1 800	16.1	5.6	1 980
Total (b)	3 830	5 120	33.7	21.5	5 632
GRAND TOTAL	4 582	5 872	28.2	17.4	6 392

## 5.9 BIOMEDICAL SCIENCES

Remarkable advances in fundamental biological sciences - especially in genetics, immunology, cell biology and molecular biology - have been put to use for research and development in the Special Programme. The objective of the Biomedical SMC (BIOS) is to identify relevant new advances and to assist their rapid introduction into the activities of other Scientific Working Groups and research institutions in developing endemic countries.

### 5.9.1 Summary of Activities

In addition to the support of research projects on basic biological aspects of diseases, the following topics have been promoted by meetings, symposia, consultations, workshops and publications:

- The molecular biology of parasites;
- The application of biochemical micromethods for the investigation of tropical disease pathogens;
- Properties of the monoclonal antibodies produced by hybridoma technology and their application to the study of diseases;

- Basic biology of microbial larvicides of vectors of human disease; and
- Application of techniques in biochemistry and molecular biology to parasite and vector identification.

### 5.9.2 Planned Activities in the 1984-85 Biennium

The SMC will continue facilitating the transfer of scientific information and techniques through activities such as courses, workshops, meetings and publications.

Several practical courses have been planned in disease endemic countries on the molecular biology of parasites. Other activities in the planning stage include the study of metabolic pathways and unique chemical structures. The research projects under way will be completed.

Following recommendations by STAC-4 and STAC-5, BIOS plans to expand its efforts to enhance the capability of laboratories in developing endemic countries to carry out high quality basic biomedical research in the major tropical diseases. These activities will be coordinated closely with the Research Capability Strengthening activities and incorporated into that area by the end of 1985.

PROGRAMME AREA II: RESEARCH AND DEVELOPMENT

Table 5.9 BIOMEDICAL SCIENCES (TRANS-DISEASE)

DESCRIPTION	OBLIGATIONS				(in US\$ 1 000)	
	1982-83		1984-85		1986-87	
	Approved	Proposed	% Increase	% Real Increase	Estimated	
(a) PLANNING AND EVALUATION						
1. Personnel Services	246	238	(3.3)	0	262	
2. Meetings	144	115	(20.1)	(32.3)	126	
Total (a)	390	353	(9.5)	(13.5)	388	
(b) OPERATIONS						
<u>SWG</u>						
Biomedical Sciences	1 173	1 000	(14.7)	(22.5)	1 100	
Total (b)	1 173	1 000	(14.7)	(22.5)	1 100	
GRAND TOTAL	1 563	1 353	(13.4)	(20.3)	1 488	

### 5.10 BIOLOGICAL CONTROL OF VECTORS

Research specific to the control of the vectors of individual diseases is carried out under the disease-oriented Scientific Working Groups, and the SWG on Biological Control of Vectors focuses on measures based on biological agents. These include spore-forming bacteria and other insect pathogens and predators which may serve to control the vectors of several different diseases.

#### 5.10.1 Summary of Activities

A system for testing new bacterial agents for potency against Simulium and mosquitoes is now in operation. Preliminary studies are in progress for field trials of Bacillus thuringiensis H-14 against mosquitoes. Promising new strains of B. sphaericus have been identified and are being tested further, and the recycling ability of this bacillus in polluted waters is under study. Ways to improve the performance of bacilli as control agents, based on biochemical, genetic and genetic engineering approaches, have been reviewed in collaboration with the SWG on Biomedical Sciences (BIOS), and projects have been initiated. Studies are continuing on fish, fungi and nematodes.

#### 5.10.2 Planned Activities for the 1984-85 Biennium

There will be an active search for potentially pathogenic agents. In addition, increased emphasis will

be given to basic studies of the mode of action of pathogens in their vector hosts.

Research and development on bacterial agents will continue to receive high priority while work on larvivorious fish will be intensified.

New strains and formulations of B.t. H-14 will be developed, as will trials on the use of B.t. H-14 for mosquito control and the extension of its use to new areas in the field. Development of facilities for local production of bacteria will be encouraged. The potential of B. sphaericus to recycle will be determined and if this species can reproduce in polluted waters it will be developed for use in tropical sewage installations. Studies on new strains of both bacterial species should provide important new information.

Studies on additional species of larvivorious fish in a wider range of habitats will be begun, featuring rearing methods and user education for application at the community level.

Extensive field evaluation of several fungal species and strains will be undertaken, including their recycling potential. The use of nematodes as control agents in endemic disease areas will be pursued as will studies on competitors and other agents to control snails. Agents attacking tsetse flies, triatomine bugs and sandflies will be sought.

PROGRAMME AREA II: RESEARCH AND DEVELOPMENT

Table 5.10 VECTOR BIOLOGY AND CONTROL (TRANS-DISEASE)

DESCRIPTION	OBLIGATIONS					(in US\$ 1 000)	
	1982-83	1984-85		1986-87		Estimated	
	Approved	Proposed	% Increase	% Real Increase			
(a) PLANNING AND EVALUATION							
1. Personnel Services	492	476	(3.3)	0	522		
2. Meetings	285	324	13.7	(3.6)	270		
Total (a)	777	800	3.0	(1.5)	792		
(b) OPERATIONS							
<u>SWG</u>							
Biological Control of Vectors	1 400	1 750	25.0	13.6	1 924		
Total (b)	1 400	1 750	25.0	13.6	1 924		
GRAND TOTAL	2 177	2 550	17.1	8.4	2 716		

5.11 EPIDEMIOLOGY

This SWG's research plan is closely coordinated with the epidemiology work of the other SWGs.

5.11.1 Summary of Activities

The two longitudinal, population-based, epidemiological research programmes in Ndola, Zambia, and in Sabah, Malaysia, have progressed on schedule. Findings from Zambia suggest that the population does not acquire protective immunity from infection with Trypanosoma brucei rhodesiense or from other trypanosome strains in the area. A community-wide intervention trial of praziquantel for the control of schistosomiasis has begun in Zambia. Baseline studies of factors contributing to the high rate of malaria, lymphatic filariasis and leprosy were completed in Sabah.

Workshops for teachers of epidemiology were held in Khartoum, Sudan, and in China. An Informal Consultation

on Diagnostic Methods for Tropical Diseases was held in collaboration with the WHO Immunology Unit.

5.11.2 Planned Activities for the 1984-85 Biennium

The activities planned for 1984-85 will be a direct extension of those already under way, but with increased emphasis on epidemiological protocol development for field research activities.

Efforts to improve the quality and amount of teaching of epidemiology will be continued. Workshops for teachers of epidemiology, focusing on epidemiological research and teaching methods are scheduled in Ethiopia for participants from Africa, and in Colombia for Spanish-speaking participants in Latin America. Cooperation with the Research Capability Strengthening Area will be continued in such activities as strengthening of postgraduate teaching programmes in Africa and in South-east Asia and in identifying postgraduate epidemiological training programmes for strengthening in selected institutions in Africa and South-east Asia.

PROGRAMME AREA II: RESEARCH AND DEVELOPMENT

Table 5.11 EPIDEMIOLOGY (TRANS-DISEASE)

DESCRIPTION	OBLIGATIONS				(in US\$ 1 000)		
	1982-83	1984-85			1986-87		
	Approved	Proposed	% Increase	% Real Increase	Estimated		
(a) PLANNING AND EVALUATION							
1. Personnel Services	370	363	(1.9)	0	395		
2. Meetings	329	300	(8.8)	(22.7)	325		
Total (a)	699	663	(5.2)	(6.1)	720		
(b) OPERATIONS							
<u>SWG</u>							
Epidemiology*	1 700	1 873	10.2	0.2	2 050		
Total (b)	1 700	1 873	10.2	0.2	2 050		
GRAND TOTAL	2 399	2 536	5.7	(3.2)	2 770		

\* Includes cost of Field Staff: 1982-83 = US\$ 232 400 per year; 1984-85 = US\$ 309 300 per year.

### 5.12 SOCIAL AND ECONOMIC RESEARCH

The objective of this SWG is to increase the effectiveness of disease control programmes through integration of human behavioural factors into programme design and management. Behaviour in this context includes the spectrum of social, cultural, and economic factors which are included in the research projects.

There are two intermediate aims:

- To define the relationship between social, cultural, and economic conditions and disease transmission and control, and
- To ensure design and use of the most cost-effective and acceptable disease control strategies.

SWG policy is to support research projects conducted by scientists from, and based in, institutions in developing endemic countries and to emphasize training activities within these projects.

#### 5.12.1 Summary of Activities

Several lines of investigation have now been established. Analyses of knowledge, attitudes and practices related to diseases in tropical populations are intended to provide a basis for improvement of the effectiveness of health education related to disease control. A study of the social and economic stratification of populations is similarly intended to provide a basis for improved strategies. A study of knowledge of tropical diseases among primary school children has revealed serious misconceptions

and gaps in knowledge, and as a result the school health curriculum is being redesigned. New techniques are being devised to measure the social and economic consequences of tropical diseases, based on linking anthropological, economic and epidemiological approaches.

The first Research Proposal Development Workshop has been held for African social scientists to promote the development of well-designed field research projects. Others will be held for other regions.

#### 5.12.2 Planned Activities in the 1984-85 Biennium

SER will support projects which will give insight into attitudes which lead to and result from disease transmission.

Additional research on evaluating the consequences of diseases at the household level will be promoted, especially in the context of other TDR-field activities (e.g., leprosy vaccine trials).

Following the recommendation of STAC-5, more emphasis will be given to economic research. Further work will be supported on relating costs to measures of effectiveness in order to guide the allocation of resources within control programmes.

Support will continue to be given to assessing behavioural interventions and community participation.

Whenever possible projects will be linked to research and control activities in affected countries and will complement or supplement the work of other SWGs.

PROGRAMME AREA II: RESEARCH AND DEVELOPMENT

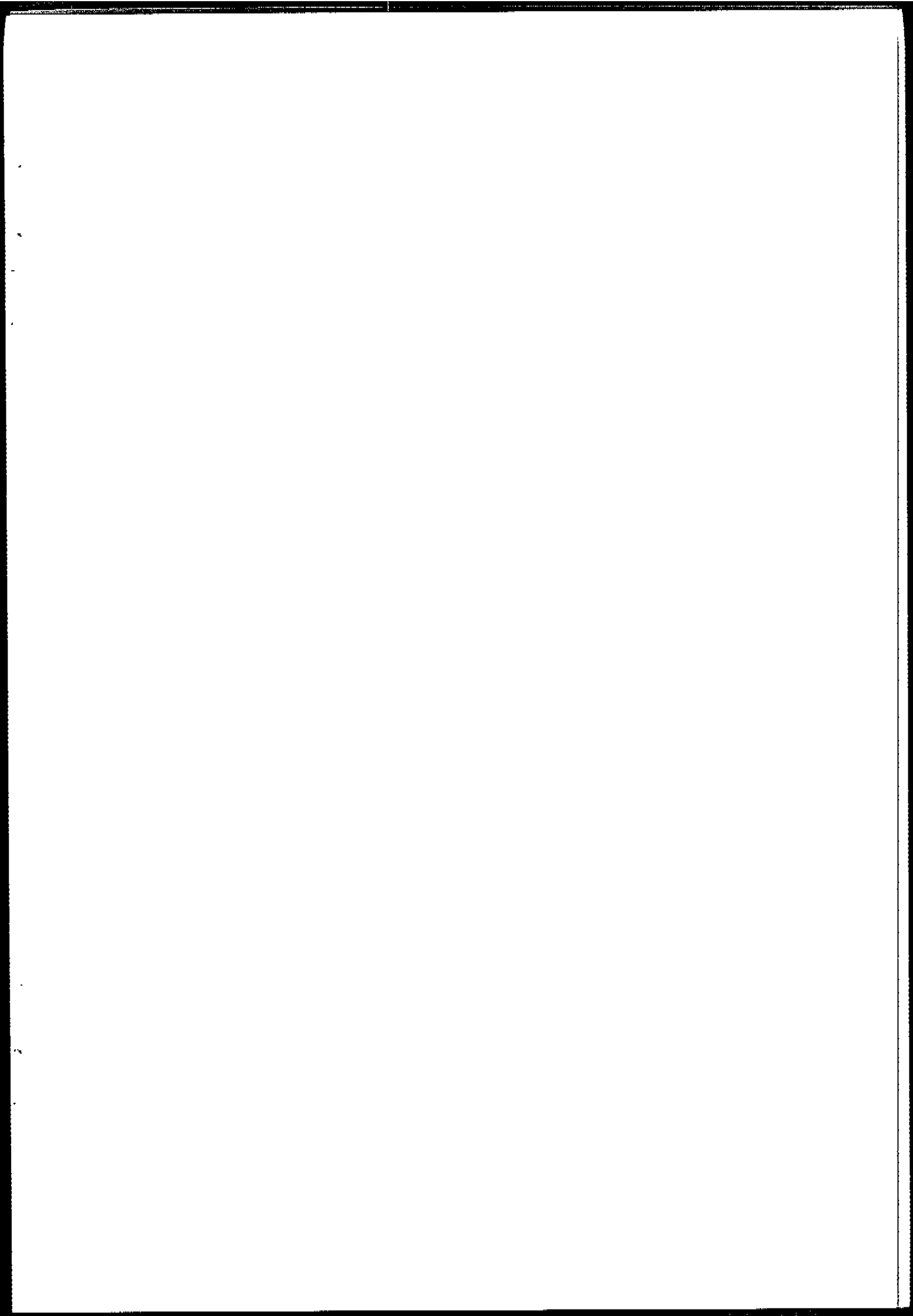
Table 5.12 SOCIAL AND ECONOMIC RESEARCH (TRANS-DISEASE)

DESCRIPTION	OBLIGATIONS (in US\$ 1 000)				
	1982-83	1984-85		1986-87	
	Approved	Proposed	% Increase	% Real Increase	Estimated
(a) PLANNING AND EVALUATION					
1. Personnel Services	246	238	(3.3)	0	262
2. Meetings	184	262	42.4	20.7	201
Total (a)	430	500	16.3	9.9	463
(b) OPERATIONS					
<u>SWG</u>					
Social and Economic Research	1 239	1 650	33.2	21.1	1 815
Total (b)	1 239	1 650	33.2	21.1	1 815
GRAND TOTAL	1 669	2 150	28.8	18.3	2 278

## PROGRAMME AREA II: RESEARCH AND DEVELOPMENT

Table 5.13 STAFF REQUIREMENTS

COMPONENTS	STAFF REQUIREMENTS (in Staff years/months)					
	1982-83 Approved		1984-85 Proposed		1986-87 Estimated	
	P	GS	P	GS	P	GS
General Activities	4	6	2	5	2	5
Malaria	8	6	8	6	8	6
Schistosomiasis	2	2	2	2	2	2
Filaria	2	2	2	2	2	2
African Trypanosomiasis	2	2	2	2	2	2
Chagas' Disease	2	2	2	2	2	2
Leishmaniasis	2	2	2	2	2	2
Leprosy	4	2	3	4	3	4
Biomedical Sciences	2	2	2	2	2	2
Vector Biology and Control	4	4	4	4	4	4
Epidemiology	4	2	4	2	4	2
Social and Economic Research	2	2	2	2	2	2
<b>TOTAL</b>	<b>38</b>	<b>34</b>	<b>35</b>	<b>35</b>	<b>35</b>	<b>35</b>



## 6. THE STRENGTHENING OF RESEARCH CAPABILITY OF TROPICAL COUNTRIES

During the period under review, the number of research and training activities related to the control of tropical diseases in developing countries continued to grow and the contribution to scientific knowledge from scientists working in these countries increased. Technical cooperation between developing countries in tropical diseases research and training also increased significantly. The following are some highlights of progress:

- Approximately one third of the publications listed for the period covered by the Sixth Programme Report came from scientists of developing countries.
- 21 of the 26 institutions that received Long-term Support Grants also received support from SMGs for specific research projects.
- 35 of the 113 scientists who were being supported for their research training during 1982 received all or part of their training in another developing country.
- Two new M.Sc. courses (one in epidemiology and one in entomology) were started in the developing countries with support from the Programme, bringing the total of such courses to eight.

The strengthening of research capability is by its nature a long-term effort and success ultimately depends on political and economic forces prevailing in developing countries. It is encouraging that, despite economic difficulties in many developing countries, in all but two of the institutions receiving support, the research and training programmes have continued and are being taken over gradually by the national authorities. This has freed funds for the strengthening of the eight additional institutions which will begin to receive long-term support in 1983.

The research programmes of the more developed institutions supported by the Special Programme are now also receiving more support from SMGs. The important technological breakthrough in the cultivation of Brugian filarial parasites in vitro resulted from work supported by an Institution Strengthening Grant.

Under the Research Strengthening Groups' comprehensive plan, the next phase of activities will involve already strengthened institutions in collaborative research and training projects with less developed institutions. Resources also will be devoted to assisting countries to develop research policies so that their research activities become an essential component of their disease control programmes.

PROGRAMME AREA III: RESEARCH CAPABILITY STRENGTHENING

Table 6.1 GENERAL ACTIVITIES (PLANNING AND EVALUATION)

DESCRIPTION	OBLIGATIONS				(in US\$ 1 000)	
	1982-83		1984-85		1986-87	
	Approved	Proposed	% Increase	% Real Increase	Estimated	
Personnel Services	1 278	1 233	(3.5)	0	1 356	
Consultants	200	220	10.0	0	242	
Duty Travel	231	270	16.9	6.3	297	
Research Strengthening Group and Executive Sub-Group Meetings	184	233	26.6	7.4	256	
Publications	23	25	8.7	0	28	
Shipping and Insurance Cost Adjustments	67	74	10.4	0	81	
TOTAL	1 983	2 055	3.6	1.6	2 260	

## PROGRAMME AREA III: RESEARCH CAPABILITY STRENGTHENING

Table 6.2 OPERATIONS

DESCRIPTION	OBLIGATIONS (in US\$ 1 000)				
	1982-83	1984-85		1986-87	
	Approved	Proposed	% Increase	% Real Increase	Estimated
1. Institutional Grants**	6 976*	7 858	12.6	2.4	8 644
2. Training	5 378*	6 429	19.5	8.7	7 072
TOTAL	12 354	14 287	15.6	5.1	15 716

\* The 1982-83 Operations budget was originally allocated as Institution Grants \$ 7 900 and Training \$ 4 454; these were subsequently reallocated as indicated in the table.

\*\* Includes cost of Field Staff: 1982-83 = US\$ 272 950 per year; 1984-85 = US\$ 334 840 per year.

PROGRAMME AREA III: RESEARCH CAPABILITY STRENGTHENING

Table 6.3 STAFF REQUIREMENTS

COMPONENTS	STAFF REQUIREMENTS (in Staff years/months)					
	1982-83 Approved		1984-85 Proposed		1986-87 Estimated	
	P	GS	P	GS	P	GS
Responsible Officer	2	-	2	-	2	-
Medical Officer	6	-	6	-	6	-
Technical Officer	2	-	2	-	2	-
Secretarial Support	-	12	-	12	-	12
TOTAL	10	12	10	12	10	12

## 7. PROGRAMME MANAGEMENT

During the early stages of Programme operation, the Joint Coordinating Board (JCB) concentrated on establishing the management mechanisms which are the framework upon which TDR has been built. By 1981 these mechanisms, from the JCB to the SWG Steering Committees, had evolved a pattern of smooth and effective operation. The scientific, technical and management activities have involved over 2 800 scientists and administrators from 126 countries and representatives of governments and research institutions; and national scientists and administrators participate with the co-sponsors and secretariat at all levels of TDR.

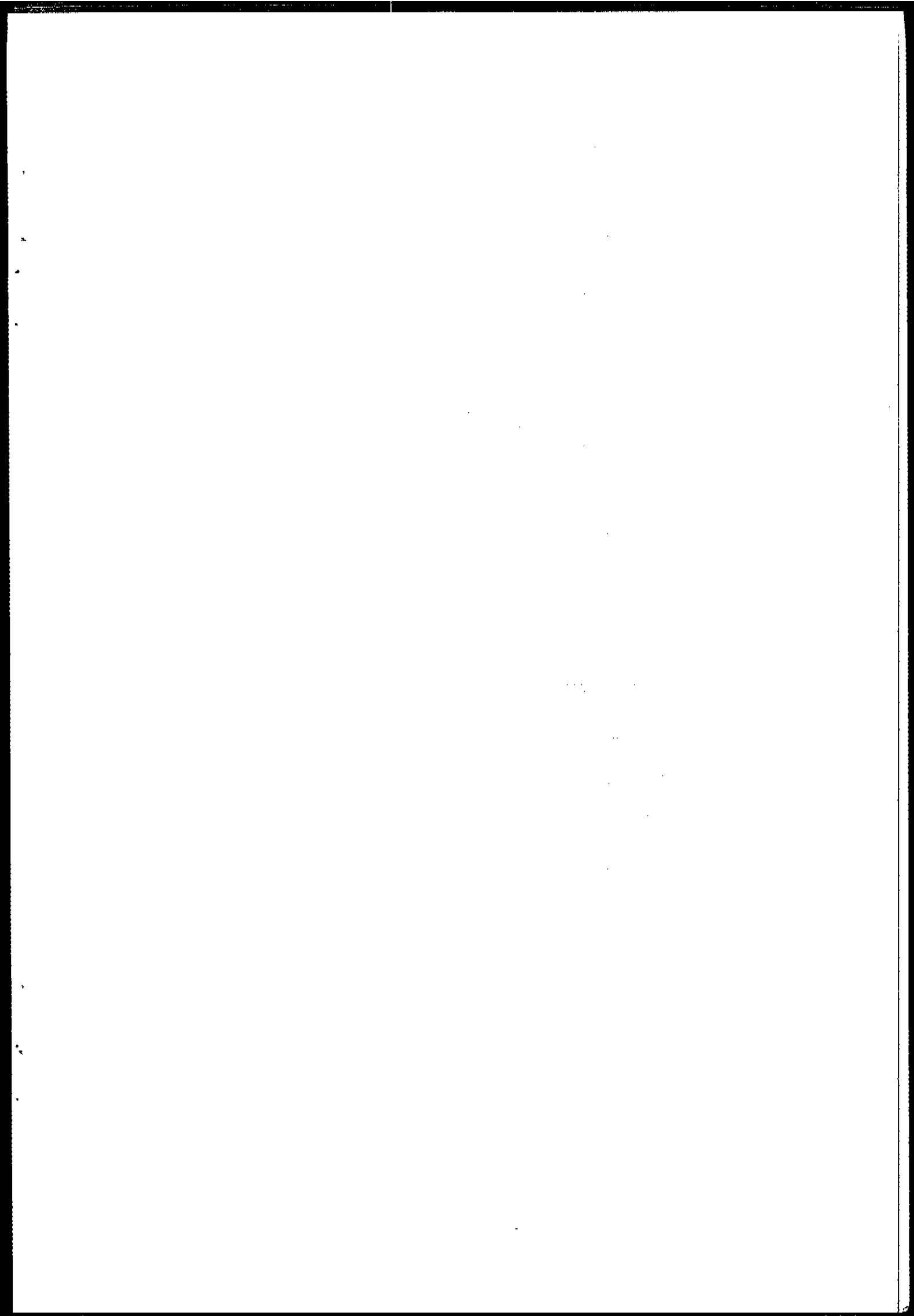
The fourth and fifth sessions of the JCB took place in Geneva on 9 and 10 December 1981 and 30 June and 1 July 1982, respectively. At its fourth session, the JCB decided to change the timing of its sessions from December to mid-year. This change enables the Board to consider a biennial Programme Report extending over two full calendar years and to review the Programme Budget proposed for the next financial biennium, six months, rather than 4 weeks, before the beginning of the biennium.

The meeting of the STAC now takes place in March of each year. The activities and plans of each Scientific Working Group and the Research Strengthening Group are reviewed in-depth by STAC once every four years using the

Scientific and Technical Review Committee mechanism (STRC) established by STAC.

The two-year cycles of reporting and budgeting give the JCB the opportunity to consider in some detail the results and plans of the technical components of the programme. JCB(5) decided that the next session of the Board would receive scientific and technical presentations from selected Steering Committee Chairmen or other appropriate persons. This decision represents a shift in emphasis by the Board from TDR's management structures and their operation to the scientific results and plans.

The efficiency of the TDR management information system (MISTR) continues to be improved and the system has been expanded to permit broader analyses of TDR activities and more effective day-to-day management. MISTR has also been linked to the WHO administrative and financial management system. This link enables TDR management to keep close control on individual project related financial and administrative processes. Communications with the scientific community also continue to be improved through the regular distribution of technical documentation to specifically selected groups of scientists and through the rapid publication of the results and future direction of scientific activities.



PROGRAMME AREA IV: PROGRAMME MANAGEMENT

Table 7.1 OPERATIONS

COMPONENTS & SUB-COMPONENTS	OBLIGATIONS (in US\$ 1 000)				
	1982-83	1984-85			1986-87
	Approved	Proposed	% Increase	% Real Increase	Estimated
<u>1. OFFICE OF THE PROGRAMME DIRECTOR</u>					
<u>1.1 Personnel Services</u>					
Director's Office	342	336	(1.8)	0	370
Programme Management	371	363	(2.2)	0	400
Communications	396	489	23.5	29.7	538
Information Systems	394	364	(7.6)	0	400
Operations and Finance	562	497	(11.6)	0	548
Sub-Sub-total	2 065	2 049	(0.8)	0.8	2 256
<u>1.2 Other Personnel Costs</u>					
Temporary Staff	305	336	10.2	0	370
Overtime	51	56	9.8	0	62
Sub-Sub-total	356	392	10.1	0	432

1.3	Support and Operations							
	Information Systems/Services	196	226	15.3	4.6	249		
	Scientific and Public							
	Information	145	160	10.3	0	176		
	Supplies and Equipment	139	153	10.1	0	168		
	Duty Travel	254	200	(21.3)	(28.3)	220		
	Sub-Sub-total	734	739	0.7	(8.5)	813		
	Sub-total (1)	3 155	3 180	0.8	(1.6)	3 501		
2.	REGIONAL OFFICES							
	2.1 Personnel Services	753	868	15.3	0	956		
	2.2 Support	80	88	10.0	0	97		
	Sub-Total (2)	833	956	14.8	0	1 053		
3.	ADMINISTRATIVE SUPPORT COSTS*	574	510	(11.2)	9.4	513		
4.	COMMON SERVICES AND ACCOMMODATIONS	912	790	(13.4)	n.a.	818		
	TOTAL	5 474	5 436	(0.7)	0.6	5 885		

\* Includes 25% of the salary and allowances of a Patent Attorney in the Office of the Legal Counsel.

PROGRAMME AREA IV: PROGRAMME MANAGEMENT

Table 7.2 STAFF REQUIREMENTS

DESCRIPTION	STAFF REQUIREMENTS (in Staff years/months)					
	1982-83 Approved		1984-85 Proposed		1986-87 Estimated	
	P	GS	P	GS	P	GS
<u>OFFICE OF THE PROGRAMME DIRECTOR</u>						
<u>Director and Supporting Staff</u>						
- Director	2	-	2	-	2	-
- Secretarial Staff	-	4	-	4	-	4
<u>Programme Management</u>						
- Responsible Officer	2	-	2	-	2	-
- Administrative Officer	2	-	2	-	2	-
- Secretarial Staff	-	2	-	2	-	2
<u>Communications</u>						
- Communications Officer	2	-	2	-	2	-
- Editorial Assistant	2	-	2	-	2	-
- Secretarial Staff	-	4	-	6	-	6
<u>Information Systems</u>						
- Management Officer (Information)	2	-	2	-	2	-
- Clerk/coders	-	4	-	4	-	4
- Secretarial Staff	-	2	-	2	-	2
<u>Operations and Finance</u>						
- Management Officer (Operations & Finance)	2	-	2	-	2	-
- Technical Assistants	-	4	-	4	-	4
- Secretarial Staff	-	4	-	4	-	4
<b>Sub-Total</b>	<b>14</b>	<b>24</b>	<b>14</b>	<b>26</b>	<b>14</b>	<b>26</b>

Table 7.2 STAFF REQUIREMENTS (CONT'D)

DESCRIPTION	STAFF REQUIREMENTS (in Staff years/months)					
	1982-83 Approved		1984-85 Proposed		1986-87 Estimated	
	P	GS	P	GS	P	GS
<u>REGIONAL OFFICES</u>						
<u>AFRO</u>						
- Medical Officer	2	-	2	-	2	-
- Secretary	-	2	-	2	-	2
<u>AMRO</u>						
- Medical Officer	2	-	2	-	2	-
- Secretary	-	2	-	2	-	2
<u>EMRO</u>						
- Medical Officer	2	-	2	-	2	-
- Secretary	-	2	-	2	-	2
<u>SEARO</u>						
- Medical Officer	2	-	2	-	2	-
- Secretary	-	2	-	2	-	2
<u>WPRO</u>						
- Medical Officer	2	-	2	-	2	-
- Secretary	-	2	-	2	-	2
Sub-total	10	10	10	10	10	10
<u>ADMINISTRATIVE SUPPORT SERVICES</u>						
	-	12	/6	12	-	12
TOTAL:	24	46	24/6	48	24	48